

value, but has kindly supplied me with the wires used in these experiments. The discussion proved the necessity of the researches which I have undertaken, and the importance of an experimental determination of the self-induction of an electric current in relation to the nature and form of its conductor.

IX. "Contribution to the Study of Intestinal Rest and Movement." By J. THEODORE CASH, M.D. Communicated by T. LAUDER BRUNTON, M.D., F.R.S. Received May 25, 1886.

(Abstract.)

Experiments were made upon a dog in which a Weller's fistula had been established. The length of the isolated intestine (upper part of the jejunum) was 18·5 cm.

By merely observing the mouths of the fistula, it was ascertained that during a condition of hunger, periods of complete quiescence, varying from two to twelve minutes, occur. At any time, however, contractions having a very regular rhythm, might make themselves manifest. On food being presented to the animal, immediately after swallowing and for some time after ingestion the movements became much more active and persistent. Some hours (four to five) after a full meal they fell to their minimum.

For the closer study of the speed of transit of a solid or semi-solid body through the fistula, travelling sounds connected with a registering apparatus were employed. Compressible but fixed sounds for the study of local contraction were also used. The most important results obtained were the following:—

1. That the act of swallowing, whether empty, *i.e.*, produced by external friction of the larynx, or of liquids, is frequently succeeded by contraction, sometimes by distinct peristalsis of the intestine. Inhalation of sulphuric ether for a few seconds—which causes abundant salivation and deglutition—is almost invariably followed by active intestinal contraction.

2. Mental impressions, tickling the walls of the abdomen or the application of cold to them, are amongst the causes of contraction of the small intestine.

3. An unfailing means of producing well-marked peristaltic contraction is the administration of food to the fasting animal. Not only does this cause the individual contractions to ensue with greater regularity and force than before, but they have less of the pendulum character (contraction succeeded by complete relaxation), and during the pauses the travelling sound is so effectually "gripped" that it

recedes but little, and is therefore forwarded through the fistula with great rapidity. For a varying time after a full meal (two to three hours), the progress of a body is steady and moderately rapid; after that time it usually becomes much slower.

The following figures give an approximate idea of the speed of transmission under various conditions:—

Fasting—

1 cm. of fistulous intestine traversed in 2 to 4'.

Immediately after a meal—

Ditto in 30 to 40".

Several hours after a meal (4 or 5)—

Ditto in some instances 1 cm. only in 10'.

4. Propulsion of a solid body is in the physiological direction.

5. The introduction of water or bodies in a state of solution into the fistulous intestine is succeeded by a constant and peculiar modification of the peristalsis which may be present at the time.

6. Exercise of slight traction upon the travelling body renders its passage difficult or impossible, although it calls into play powerful and "gripping" contractions of the intestine.

7. Exercise is highly favourable to a rapid and effective peristalsis.

8. Mechanical irritation (as the licking of the mouth of the fistula by the rough tongue of a dog) causes powerful co-ordinate movement.

9. The effect of electrical stimulation, and the action of a large number of drugs have been examined, the results obtained will be made the object of a further communication.

The President announced that Professor Dewar, F.R.S., had succeeded in obtaining oxygen in the solid state, and that he, with some others, had that afternoon witnessed the experiment.

The Society adjourned over Ascension Day to Thursday, June 10th.